Data Logger for Measuring Body Dynamics in Spaceflight Environment (MBISE), Phase I

Completed Technology Project (2018 - 2019)

Project Introduction

During dynamic events such as launch, ascent abort, atmospheric reentry, descent, and landing, crewmembers will experience significant inertial and vibrational loading. To this date, data has not been collected in flight. There is particular interest in the chest, neck, and head region, which are exceptionally sensitive areas. Quantifying the loading on the crewmembers will allow refined simulations that can lead to improve safety, reduce injury, and more efficient designs.

Midé proposes leveraging the commercially available Slam Stick as the foundation for the effort. This device was originally developed for shock and vibration testing of the F-18 and achieves nearly all of the required capabilities in the current state. The Slam Stick is already equipped with gyros, accelerometers, temperature, pressure, selectable triggers, battery powered, and has required accuracy, sample rate, and processing power. Key improvements to the power system, increased gyro performance, and packaging will be the primary goals of the Phase I effort. The Phase II effort can then focus on system packaging and testing for flight.

The final system will increase the capabilities of Midé's data logger line. With exceptional commercial and government sales, Midé continues to invest resources in the product line.

Anticipated Benefits

Pilot and Passenger Dynamics – tracking motion and loading of the individual with accelerometer and gyro data.

Cockpit and Station Monitoring – monitor the environmental by including additional sensors pressure (hypoxia), humidity, temperature, and brightness.

Hardware Testing and Evaluation – Affix the data logger to other hardware for quick and inexpensive testing and data acquisition such as shock, vibration, and pressure testing without interfering with the experiment.

Self-contained data logging system – Can be mounted in hard to access areas such as in the flow field, rotating frame, or compact spaces.

Hardware Testing and Eval – For testing and data acquisition such as shock, vibration, and pressure testing without interfering with the experiment.

Health Monitoring – With the selectable trigger, the system could wake at select intervals to gather data or watch for out of bound events such as excessive vibrations health data can be extracted over time.

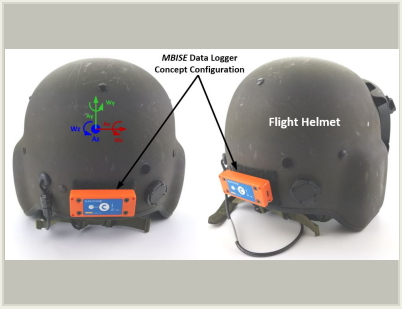

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Table of Contents

Data Logger for Measuring Body Dynamics in Spaceflight Environment (MBISE), Phase I

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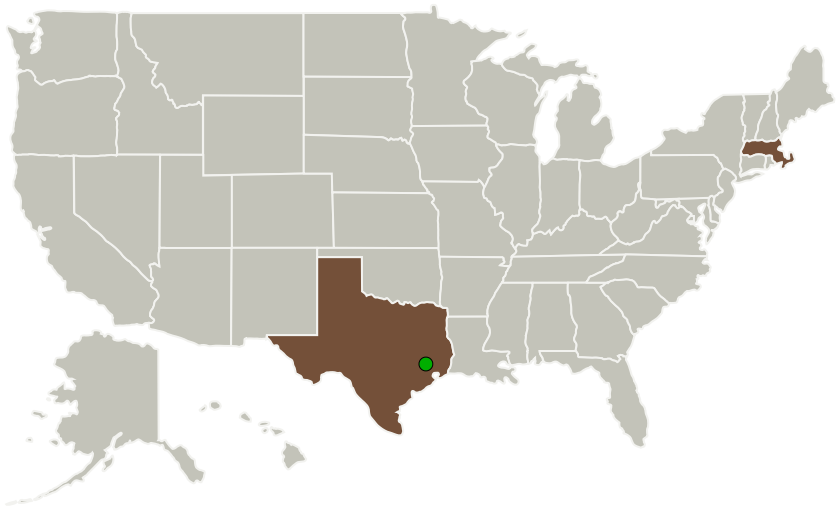
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Mide Technology Corporation	Lead Organization	Industry	Medford, Massachusetts
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Massachusetts	Texas

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/141321)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mide Technology Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

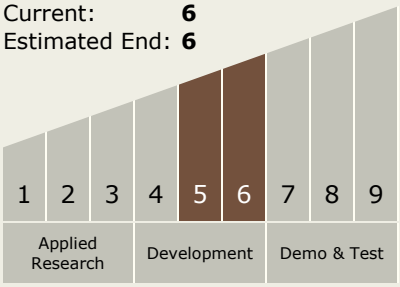
Carlos Torrez

Principal Investigator:

Jeffrey Court

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



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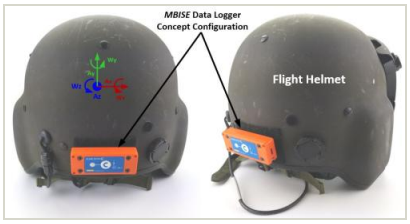
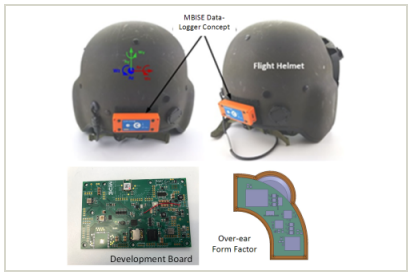
Images



Briefing Chart Image
Data Logger for Measuring Body Dynamics in Spaceflight Environment (MBISE), Phase I
(https://techport.nasa.gov/image/136005)



Final Summary Chart Image
Data Logger for Measuring Body Dynamics in Spaceflight Environment (MBISE), Phase I
(https://techport.nasa.gov/image/131171)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.2 Fire: Detection, Suppression, and Recovery

Target Destination

Earth